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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/772,433	02/06/2004	Marcus Leech	57983.000164	5978

7590 06/18/2007
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EXAMINER

LANIER, BENJAMIN E

ART UNIT	PAPER NUMBER
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2132

MAIL DATE	DELIVERY MODE
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06/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/772,433	LEECH, MARCUS	
	Examiner	Art Unit	
	Benjamin E. Lanier	2132	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 10, 19 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Claims 10, 19 are directed to a carrier wave. Claims that recite nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, per se, and as such are nonstatutory natural phenomena. O'Reilly, 56 U.S. (15 How.) at 112-14. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in §101 (Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility Annex IV, Oct. 26, 2005, at http://www.uspto.gov/web/offices/pac/dapp/opla/preognotice/guidelines101_20051026.pdf, 1300 OG 142 (Nov. 22, 2005)).

3. The Supreme Court has read the term “manufacture” in accordance with its dictionary definition to mean “the production of articles for use from raw or prepared materials by giving to these materials new forms, qualities, properties, or combinations, whether by hand-labor or by machinery.” Diamond v. Chakrabarty, 447 U.S. 303, 308, 206 USPQ 193, 196-97 (1980) (quoting American Fruit Growers, Inc. v. Brogdex Co., 283 U.S. 1, 11, 8 USPQ 131, 133 (1931), which in turn, quotes the Century Dictionary). Other courts have applied similar definitions. See American Disappearing Bed Co. v. Arnaelsteen, 182 F.324, 325 (9th Cir. 1910), cert. denied, 220 U.S. 622 (1911). These definitions require physical substance, which a claimed signal does not

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have. Congress can be presumed to be aware of an administrative or judicial interpretation of a statute and to adopt that interpretation when it re-enacts a statute without change. Lorillard v. Pons, 434 U.S. 575, 580 (1978). Thus, Congress must be presumed to have been aware of the interpretation of manufacture in American Fruit Growers when it passed the 1952 Patent Act.

4. A manufacture is also defined as the residual class of product. 1 Chisum, §1.02[3] (citing W. Robinson, The Law of Patents for Useful Inventions 270 (1890)). A product is a tangible physical article or object, some form of matter, which a signal is not. That the other two products classes, machine and composition of matter, require physical matter. A signal, a form of energy, does not fall within either of the two definitions of manufacture. Thus, a signal does not fall within one of the four statutory classes of §101.

Claim Rejections - 35 USC § 112

5. Claims 2, 7, 13, 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. Claims 2, 7, 13, 17 are indefinite because it is unclear from the claims whether the first and second mask values are different. The claim recites how the first and second mask values are computed, but only recites one computation. Therefore, the first and second mask values will be treated as equivalent values.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1, 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Rogaway, OCB: A Block-Cipher Mode of Operation for Efficient Authenticated Encryption (from IDS dated 06 February 2004). Referring to claims 1, 10, 11, Rogaway discloses encrypting a message by exclusive or'ing a block of the message with a corresponding block of a generated value (Page 5, $M[i] \oplus Z[i]$), which meets the limitation of whitening at least one message block with a first mask value. The result of that exclusive or operation is encrypted (Page 5) using a block cipher (Page 4), which meets the limitation of encrypting the whitened at least one message block using a block cipher and a first key. The result of the encryption is the exclusive or'ed with a corresponding block of the generated value (Page 5), which meets the limitation of whitening the encrypted at least one message block with a second mask value to generate at least one corresponding output ciphertext block.

Referring to claim 8, Rogaway describes the decryption process where cipherblocks are XOR'd with the corresponding block of the generated Z value (Page 5), which meets the limitation of whitening the at least one output ciphertext block with the second mask value. The result of the XOR function is decrypted with the key (Page 5), which meets the limitation of decrypting the at least one whitening ciphertext block using a block cipher and a first key. The decrypted value is then XOR's with the corresponding block of the generated Z value (Page 5), which meets the limitation of whitening the at least one decrypted block with a first mask value to generate at least one corresponding message block.

Referring to claim 9, Rogaway discloses that the block cipher used is the AES block cipher (Page 6, first paragraph), which meets the limitation of the block cipher is AES.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 2-7, 12-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rogaway, in view of Schneier. Referring to claim 2, Rogaway discloses that the corresponding block of the generated value is generated based on the XOR of an encrypted nonce (Page 5, R) and an encrypted value (Page 5, L), which meets the limitation of the first and second mask values are computed by applying a XOR function to a first value derived from a nonce value and a second value derived from encrypting a third value using the block cipher and a key. Rogaway does not specify that the key used to encrypt the value to generate the 'L' (Page 5) is different than the key used to encrypt $M[i] \oplus Z[i]$ (Page 5). However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use multiple keys in the encryption algorithm in order to enhance the strength of the encryption algorithm by making the algorithm more difficult to break. Using only a single encryption key is easier break than using

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multiple because an attacker would only need to discover the one key as opposed to having to discover every key that is used in the encryption algorithm. Rogaway also does not disclose applying a substitution function to the result of the XOR function on L and R. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform a substitution function on the result of the XOR function on L and R because substitution operations are an important part of block cipher algorithms that give them security as taught by Schneier (Page 275).

Referring to claim 3, Rogaway discloses that to compute the R value, the nonce is XOR'd with L and the result of the XOR function is encrypted with key K (Page 5), which meets the limitation of the first value derived from the nonce value is computed by encrypting the nonce value using the block cipher and the first key.

Referring to claim 4, Rogaway discloses that the L value is generated by encrypted a finite string (Page 5), but does not disclose that the finite string is randomly generated. It would have been obvious to one of ordinary skill in the art at the time the invention was made to randomly generated the finite string used to calculate the L value in Rogaway such that the finite string would be unpredictable, thus increasing the security of cryptographic algorithm as taught by Schneier (Page 45).

Referring to claim 5, Rogaway discloses encrypting a message by exclusive or'ing a block of the message with a corresponding block of a generated value (Page 5, $M[i] \oplus Z[i]$). The result of that exclusive or operation is encrypted (Page 5) using a block cipher (Page 4). The result of the encryption is the exclusive or'ed with a corresponding block of the generated value

(Page 5), which meets the limitation of the steps of whitening each comprise the step of applying a XOR function, the first and second mask being equal.

Referring to claims 6, 12, 19, 20, Rogaway discloses that each message blocks is concatenated (Page 5, checksum generation function), which meets the limitation of applying a XOR function to all message blocks of a message to compute a XOR-sum. The checksum is then XOR'd with $Z[m]$ (Page 5, calculation of value 'T'), which meets the limitation of applying a third mask value to the XOR-sum. The result of the XOR function is then encrypted (Page 5, calculation of value 'T'), which meets the limitation of encrypting the masked XOR-sum using the block cipher and the first key. Rogaway does not disclose XOR'ing the result of the encryption with a value. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to XOR the data after the block algorithm, in addition to before, because this technique is not susceptible to meet-in-the-middle attack as taught by Schneier (Page 367).

Referring to claims 7, 13, Rogaway discloses that the corresponding block of the generated value is generated based on the XOR of an encrypted nonce (Page 5, R) and an encrypted value (Page 5, L), which meets the limitation of the first and second mask values are computed by applying a XOR function to a first value derived from a nonce value and a second value derived from encrypting a third value using the block cipher and a key. Rogaway does not specify that the key used to encrypt the value to generate the 'L' (Page 5) is different than the key used to encrypt $M[i] \oplus Z[i]$ (Page 5). However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use multiple keys in the encryption algorithm in order to enhance the strength of the encryption algorithm by making the algorithm

more difficult to break. Using only a single encryption key is easier break than using mutiple because an attacker would only need to discover the one key as opposed to having to discover every key that is used in the encryption algorithm. Rogaway also does not disclose applying a substitution function to the result of the XOR function on L and R. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform a subsitution function on the result of the XOR function on L and R because substitution operations are an important part of block cipher algorithms that give them security as taught by Schneier (Page 275).

Referring to claim 14, Rogaway discloses that to compute the R value, the nonce is XOR'd with L and the result of the XOR function is encrypted with key K (Page 5), which meets the limitation of the first value derived from the nonce value is computed by encrypting the nonce value using the block cipher and the first key.

Referring to claims 15, 16, Rogaway discloses encrypting a message by exclusive or'ing a block of the message with a corresponding block of a generated value (Page 5, $M[i] \oplus Z[i]$), which meets the limitation of whitening at least one message block with a third mask value. The result of that exclusive or operation is encrypted (Page 5) using a block cipher (Page 4), which meets the limitation of encrypting the whitened at least one message block using a block cipher and a first key. The result of the encryption is the exclusive or'ed with a corresponding block of the generated value (Page 5), which meets the limitation of whitening the encrypted at least one message block with the third mask value to generate at least one corresponding output ciphertext block.

Referring to claim 17, Rogaway discloses that the corresponding block of the generated value is generated based on the XOR of an encrypted nonce (Page 5, R) and an encrypted value (Page 5, L), which meets the limitation of the first and second mask values are computed by applying a XOR function to a first value derived from a nonce value and a second value derived from encrypting a third value using the block cipher and a key. Rogaway does not specify that the key used to encrypt the value to generate the 'L' (Page 5) is different than the key used to encrypt $M[i] \oplus Z[i]$ (Page 5). However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use multiple keys in the encryption algorithm in order to enhance the strength of the encryption algorithm by making the algorithm more difficult to break. Using only a single encryption key is easier break than using multiple because an attacker would only need to discover the one key as opposed to having to discover every key that is used in the encryption algorithm. Rogaway also does not disclose applying a substitution function to the result of the XOR function on L and R. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to perform a substitution function on the result of the XOR function on L and R because substitution operations are an important part of block cipher algorithms that give them security as taught by Schneier (Page 275).

Referring to claim 18, Rogaway discloses that the block cipher used is the AES block cipher (Page 6, first paragraph), which meets the limitation of the block cipher is AES.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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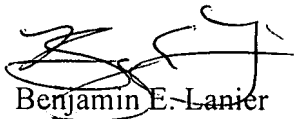
Joe Kilian, How to Protect DES Against Exhaustive Key Search (An Analysis of DESX)

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Benjamin E. Lanier whose telephone number is 571-272-3805.

The examiner can normally be reached on M-Th 7:30am-5:00pm, F 7:30am-4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gilberto Barron can be reached on 571-272-3799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Benjamin E. Lanier